

## CLAIMS

- 1.
- 5 A membrane comprising a support structure coated with crosslinked polyvinylamine, wherein the crosslinking agent is a compound comprising a fluoride.
- 10 2.
- 14 The membrane according to claim 1, wherein the polyvinylamine comprises water.
- 15 3.
- 19 The membrane according to claim 1 or 2, wherein the polyvinylamine of the membrane is swelled by water vapour or a water containing diluent.
- 20 4.
- 24 The membrane according to claim 1, 2 or 3, wherein the support structure is a flat sheet membrane or a hollow fibre membrane.
- 25 5.
- 29 The membrane according to claim 1, wherein the support structure is a membrane having a molecular weight cut-off in the range of from about 20,000 to about 40,000.
- 30 6.
- 34 The membrane according to any one of claims 1 – 5, wherein the support structure is a membrane having a molecular weight cut-off which is about 10,000, such as about 15,000, for example about 20,000, less than the molecular weight of the polyvinylamine.
- 35 7.
- 39 The membrane according to any one of the previous claims, wherein the support structure is made of polysulfone.
- 40 8.
- 44 The membrane according to any one of the previous claims, wherein the molecular weight of said polyvinylamine is above about 30,000, such as above about, 50,000, for example above about 70,000 or even above 100,000.

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The membrane according to claim 8, wherein the molecular weight of said polyvinylamine is below about 150,000.

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10.

The membrane according to any one of the previous claims, wherein the crosslinking agent is selected from the group comprising: ammonium fluoride, ammonium bifluoride, and hydrofluoric acid.

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11.

The membrane according to claim 10, wherein the crosslinking agent is ammonium fluoride.

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12.

A process for producing a membrane according to any one of the previous claims, comprising:

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- preparing polyvinylamine;
- coating said polyvinylamine on a support structure to obtain a membrane;
- crosslinking the polyvinylamine of the membrane with a compound comprising a fluoride.

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13.

The process according to claim 12, further comprising:

- swelling said polyvinylamine of said membrane by exposing said polyvinylamine for water vapour or a water containing diluent.

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14.

The process according to claim 12 or 13, wherein the polyvinylamine has a molecular weight above about 30,000, such as above about, 50,000, for example above about 70,000.

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15.

The process according to claim 12, 13 or 14, wherein the molecular weight of said polyvinylamine is below about 150,000.

16.

Use of a membrane according to any one of claims 1 to 11, for separation of CO<sub>2</sub> from gas mixtures.